

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE

SPECIFICATION

COMBINATION TOOL

1. SCOPE

1.1 Scope. This specification covers the combination tool, which has a shovel blade and a pick and resembles a long-handled military entrenching tool (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals.

SPECIFICATIONS

FEDERAL

- | | | |
|-----------|---|---|
| NN-H-81 | - | Handles, Ash |
| TT-C-490 | - | Cleaning Methods for Ferrous Surfaces and Pretreatments
for Organic Coatings |
| PPP-B-636 | - | Boxes, Shipping, Fiberboard |

MILITARY

- | | | |
|-------------|---|---|
| DOD-P-16232 | - | Phosphate Coatings, Heavy, Manganese or Zinc Base
(for Ferrous Metals) |
| MIL-A-8625 | - | Anodic Coatings, for Aluminum and Aluminum Alloys |

Beneficial comments (recommendations, additions, deletions) and any pertinent data that may be used in improving this document should be addressed to: USDA Forest Service, Missoula Technology and Development Center, Building 1, Fort Missoula, Missoula, MT 59801-7294 by using the Specification Comment Sheet at the end of this document or by letter.

STANDARDS

FEDERAL

- FED-STD-123 - Marking for Shipment (Civil Agencies)
- FED-STD-151 - Metals; Test Methods
- FED-STD-376 - Preferred Metric Units for General Use by the Federal Government
- FED-STD-595 - Colors (Requirements for Individual Color Chips)

MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Ave., Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals.

DRAWINGS

USDA FOREST SERVICE

- MEDC-736 - Tool, Combination Fireline M-1984

(Address requests for copies to USDA Forest Service, Missoula Technology & Development Center, Building 1, Fort Missoula, Missoula, MT 59801-7294.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those in effect on the date of the invitation for bids or request for proposals.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- B 85 - Standard Specification for Aluminum-Alloy Die Castings
- D 3951 - Standard Practice for Commercial Packaging
- E 18 - Standard Test Methods for Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials

(Address requests for copies to American Society for Testing and Materials, 1916 Race St., Philadelphia, PA 19103-1187.)

AMERICAN WELDING SOCIETY

A2.4-93 - Standards for Welding and Non-Destructive Testing

(Address requests for copies to American Welding Society, P.O. Box 351040, Miami, FL 33135.)

IRON AND STEEL SOCIETY

Alloy, Carbon and High Strength Steel, Semifinished for Forging, Hot Rolled Bars; Cold Finished Steel Bars; Hot Rolled Deformation and Plain Concrete and Reinforced Bar

(Address requests for copies to Iron and Steel Society, 410 Commonwealth Dr., Warrendale, PA 15086.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Address requests for copies to American Trucking Association, Inc., Traffic Department, 1616 P St. NW, Washington, DC 20036.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification

(Address requests for copies to Uniform Freight Classification Committee, Room 1106, 222 S. Riverside Plaza, Chicago, IL 60606.)

(Non-Government standards and other publications normally are available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of conflict between the text of this document and a reference cited herein, the text of this document shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. Unless otherwise specified (see 6.2), a sample tool shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.2 Materials and components. The combination tool shall conform in all respects to the design, details, dimensions, and materials specified herein and in the referenced drawing, MEDC-736. Should there be a conflict between the text of this document and the drawing, this document takes precedence, unless otherwise specified.

3.2.1 Steel composition and hardness. The steel parts of the combination tool shall conform to the requirements specified in table I. Steel composition shall be determined as specified in 4.5.1.1 and steel hardness when tested in accordance with 4.5.1.2.

TABLE I. Physical requirements for steel parts 1/

<u>Tool Part</u>	<u>AISI/SAE Steel 2/</u>	<u>Rockwell C Scale Hardness</u>
Blade	1050	40-46
Pick	1050	40-46
Hinge	1050	40-46
Hinge Attachment	1144	38-44
Hinge Rivets	1010	---
Thrust Washer	1050	40-46
Pivot Bolt	1040	38-44
Locknut	Low carbon	---
Handle Attachment	1030	28-34

1/ Dimensional requirements shall be as shown in drawing MEDC-736.

2/ Minimum carbon content.

3.2.2 Locking nut. The locking nut shall be a die-casting (A380) aluminum alloy meeting the requirements of ASTM B 85.

3.2.3 Handle rivet. The rivet affixing the handle to the tool head shall be steel #6 by 1-13/16 inches. The rivet head shall be oval.

3.2.4 Handle. The handle shall be ash, conforming to grade A of NN-H-81. Dimensions shall conform in all respects to drawing MEDC-736. The handle shall be free from crooks, bows, cracks, splits, and scores. Alignment of the grain of the handled tool shall run parallel to the center line of the handle and 90 \pm 15 degrees with the handle rivet, as illustrated in MEDC-736.

3.3 Finish.

3.3.1 Blade cutting edge. The cutting edge of the blade shall be ground to 45 \pm 5 degrees as shown in drawing MEDC-736. The sharpening operation shall take place after serrations have been formed in the blade.

3.3.2 Steel components. Before assembly, the blade, pick, and hinge shall be pretreated for painting in accordance with TT-C-490 then painted with a black enamel matching color chip 37038 of FED-STD-595 to provide a rust-resistant finish. The thrust washer shall be finished after bonding to the locking nut (see 3.4.3). The pivot bolt, locknut, hinge rivets, and hinge attachment/handle attachment subassembly (after mig weld) shall be given a black phosphate finish meeting the requirements of type Z, class 1 of DOD-P-16232. Color shall match color chip 37038 of FED-STD-595. The handle rivet shall be zinc-plated.

3.3.3 Locking nut. Before assembly, the aluminum locking nut shall be anodized in accordance with type II, class 2 of MIL-A-8625. After bonding, locking nut and thrust washer both shall be painted with a black enamel to provide a rust-resistant finish. The black enamel shall match color chip 37038 of FED-STD-595.

3.3.4 Handle. The handle shall be sanded to a smooth finish and coated with a minimum of two coats of clear waterbase lacquer. No wax or stain is allowed. The coating shall be applied in a manner to permit visual inspection of the wood and to prevent absorption of water. The lacquer shall be applied evenly over the surface and shall be free of sags, runs, blisters, drips, wrinkles, frothing, or other defects characteristic of improper application or cure. If the dip method is used, coating of the tapered end of the handle is optional.

3.4 Tool assembly.

3.4.1 Riveting.

3.4.1.1 Hinge to blade. The hinge shall be affixed to the blade with three rivets. Rivet holes shall be positioned as shown in MEDC-736. Hinge rivets shall be solid, flat-headed and when driven shall completely fill the holes. The rivet heads shall be full, neatly made, concentric with the rivet hole, and shall be in full contact with the surface of the riveted member.

3.4.1.2 Handle rivet. The rivet affixing the handle and tool head assembly shall be positioned as shown in MEDC-736.

3.4.2 Weld. The weld joining the handle and hinge attachments shall be a mig weld located as shown in MEDC-736. The weld shall conform to American Welding Society Standard A2.4-93 in all respects.

3.4.3 Bonding thrust washer to locking nut. The thrust washer and locking nut shall be free of dirt and oil before bonding. The thrust washer shall be aligned with and bonded to the locking nut as shown in MEDC-736. The bonding agent shall be an epoxy adhesive and the resulting bond shall not loosen or separate when subjected to the test specified in 4.5.1.3.

3.4.4 Lubrication. Before threading the locking nut to the hinge attachment, the threads of the hinge attachment shall be submerged in a dry film lubricant (see 6.4). The hinge attachment shall be removed from the lubricant and the locking nut immediately assembled. The subassembly shall be placed in a suitable container to maintain the subassembly in a vertical position, allowing the lubricant to dry. The hinge shall be lubricated after assembly.

3.4.5 Blade and pick assembly. The blade and pick shall be assembled together with a pivot bolt and locknut. The blade and pick shall pivot on the bolt to form the blade/pick working positions shown in figure 1 and shall have no more than 1/64 inch of movement when tested as specified in 4.5.2.1.

3.4.6 Moisture content. Moisture content of the handle at the time of assembly shall not exceed 13 percent when tested as specified in 4.5.2.2.

3.5 Strength. Combination tools shall show no fracture of components and shall have no permanent deflection in excess of 1 inch when tested as specified in 4.5.2.3.

3.6 Identification marking. The FSS mark shall be metal stamped in 1/4-inch-high maximum letters at the blade location shown on drawing MEDC-736. The manufacturer's name or trademark shall be metal stamped in a smaller size on the handle attachment.

3.7 Workmanship. The surface of the tool shall be free of burrs, slivers, sharp corners, and rough or sharp edges, except that the cutting edges of the blade shall be sharpened in accordance with 3.3.1. All imperfections shall be removed from the beveled, serrated cutting edges. The coating shall be a continuous, uniform, smooth, dry film without any area of no film, and shall be free from embedded foreign matter.

3.8 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within the tolerances specified using conversion tables contained in the latest revision of FED-STD-376, and all other requirements of this specification are met.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his/her own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in this specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Responsibility for dimensional requirements. Unless otherwise specified in the contract or purchase order, the contractor is responsible for ensuring that all specified dimensions have been met. When dimensions cannot be examined on the end item, inspection shall be made at any point or at all points in the manufacturing process necessary to ensure compliance with all dimensional requirements.

4.2 Sampling for inspections and tests. Sampling for inspections and tests shall be made in accordance with MIL-STD-105. Inspection levels and acceptable quality levels (AQL) shall be as specified. All tools manufactured at one time shall be considered a lot for purposes of acceptance inspection and test. A sample unit shall be one combination tool complete with attached handle.

4.3 Quality conformance inspection. Inspection shall include in-process examination (see 4.3.2.1) and in-process testing (see 4.3.2.2). Each end item lot shall be sampled and inspected as specified in 4.3.3. Each lot shall be sampled and tested as specified by 4.5.1. Test reports showing compliance with 4.5.2.1 through 4.5.2.3 shall be submitted as part of quality conformance inspections. The packaging shall be inspected as specified in 4.4. Packaging is not required when first articles are presented unless otherwise specified (see 6.2). As part of quality conformance inspections, data analysis shall be submitted to determine compliance of the steel composition as specified in 4.5.1.1 and steel hardness as specified in 4.5.1.2. When conducting quality conformance inspections of first articles, the presence of any defect or failure of any test shall be cause for rejection of the first article.

4.3.1 Component and material inspection. To meet the requirements of 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents, drawings, and standards unless otherwise excluded, amended, modified, or qualified in this document or applicable purchase document.

4.3.2 In-process inspection.

4.3.2.1 In-process examination. Inspection shall be made during the manufacturing process to determine whether components meet the requirements specified in table II. Whenever nonconformance is noted, correction shall be made to the parts affected and lot in process. Components that cannot be corrected shall be removed from production

TABLE II. In-process examination

<u>Requirement</u>	<u>Requirement Paragraph</u>
Pretreating steel components before finish is applied	3.3.2
Anodizing aluminum locking nut before surface finishing	3.3.3
Rivet holes filled	3.4.1.1
Prebonding preparation	3.4.3
Thrust washer alignment	3.4.3

4.3.2.2 In-process testing. Before assembly, the blade, pick, hinge, hinge attachment, hinge rivets, thrust washer, pivot bolt, locknut, and handle attachment shall be tested in accordance with 4.5.1.2 to determine compliance with 3.2.1. Each steel component shall be tested separately. The lot shall be all steel components heat treated as a group and offered for inspection at one time. The sample unit shall be one of each component. The inspection level shall be S-2 with an acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 2.5.

4.3.3 End item inspection. The end items shall be examined for the defects listed in tables III and IV. The inspection level shall be S-3, the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 2.5 for major and 6.5 for minor defects.

TABLE III. End item visual defects

<u>Examine</u>	<u>Defect</u>	<u>Classification</u>	
		<u>Major</u>	<u>Minor</u>
Blade and hinge	Metal not as specified	X	
	Rivet not as specified	X	
	Rivet missing	X	
	Rivet not peened, curled, or end not mushroomed	X	
	Rivet head missing	X	
	Rivet not in full contact with surface of riveted member	X	
	Rivet reversed so rivet head on incorrect side	X	
	Serrations missing	X	
	Blade edge not beveled	X	
	Feather edge not removed from beveled/ serrated cutting edge		X
	Finish not as specified		X
	Dirt or other foreign matter embedded in finish		X
	Rust on blade/hinge	X	
	Color not as specified		X
	Area(s) of bare metal		X
	Pick	Metal not as specified	X
Finish not as specified			X
Dirt or other foreign matter embedded in finish			X
Rust on pick		X	
Area(s) of bare metal			X
Hinge attachment	Metal not as specified	X	
	Threads crossed, damaged, or not compatible with locking nut	X	
	Finish not as specified		X
	Dirt or other foreign matter embedded in finish		X
	Rust on hinge attachment	X	
	Area(s) of bare metal		X
	No lubricant on threads		X

TABLE III. End item visual defects - Continued

<u>Examine</u>	<u>Defect</u>	<u>Classification</u>	
		<u>Major</u>	<u>Minor</u>
Locking nut	Metal not as specified	X	
	Threads crossed, damaged, or not compatible with hinge attachment	X	
	Finish not as specified		X
	Dirt or other foreign matter embedded in finish		X
	Area(s) of bare metal		X
	No lubricant on threads		X
Thrust washer	Not as specified	X	
	Not aligned with locking nut	X	
	Finish not as specified		X
	Dirt or other foreign matter embedded in finish		X
	Rust on thrust washer	X	
	Area(s) of bare metal		X
Pivot bolt and locknut	Not as specified	X	
	Threads crossed or damaged	X	
	Finish not as specified		X
	Dirt or other foreign matter embedded in finish		X
	Rust on bolt or locknut	X	
	Area(s) of bare metal		X
Handle attachment	Metal not as specified		X
	Any rust, cracks, burrs, laps, flash or cupping	X	
	Hole not in location specified		X
	Split not in location specified		X
	Rivet not as specified	X	
	Rivet missing or not in location specified	X	
	Weld not as specified	X	
Handle	Wood not as specified	X	
	Poor finish with blisters, drips, wrinkles, frothing, etc.	X	
	Wax or stain used	X	
	Grain of wood to parallel to centerline and split of handle attachment	X	
	Crooks, bows, cracks, etc.	X	
Markings: FSS and contractor logo	Omitted, incorrect, illegible, misplaced, or size of characters not as specified		X

TABLE III. End item visual defects - Continued

<u>Examine</u>	<u>Defect</u>	<u>Classification</u>	
		<u>Major</u>	<u>Minor</u>
Blade and hinge	Dimensions and configuration not as specified	X	
	Hardness not as specified	X	
	Blade movement when locking nut engaged exceeds 1/64 inch	X	
	Cutting edge angles not as specified	X	
	Marking not as specified (FSS and manufacturer's name or symbol)		X
Pick	Dimensions and configuration not as specified	X	
	Hardness not as specified	X	
	Pick movement when locking nut engaged exceeds 1/64 inch	X	
Hinge attachment	Dimensions and configuration not as specified	X	
	Hardness not as specified	X	
Locking	Dimensions and configuration not nut as specified	X	
	Hardness not as specified	X	
Thrust washer	Dimensions and configuration not as specified	X	
	Hardness not as specified	X	
Pivot bolt and locknut	Dimensions and configuration not as specified	X	
	Hardness not as specified	X	
Handle attachment	Dimensions and configuration not as specified	X	
	Hardness not as specified	X	
Handle	Dimensions and configuration not as specified	X	
	Handle rivet not as specified	X	

4.4 Packaging examination. The fully packaged end items shall be examined for the defects listed below. The lot size shall be expressed in units of shipping containers. The sample unit shall be one shipping container fully packaged. The inspection level shall be S-3 and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

<u>Examine</u>	<u>Defect</u>
Markings (external and unit pack)	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application
Materials	Any component missing, damaged, or not as specified
Workmanship	Inadequate application of components, such as cushioning; inadequate, bulged, or distorted interior container
Contents	Number per interior box and shipping container is more or less than required

4.5 Tests.

4.5.1 Component material testing.

4.5.1.1 Steel composition testing. The steels used to fabricate the steel components listed under 3.2.1 shall be tested in accordance with FED-STD-151, method 111.2 or 112.2 to verify steel composition as required in 3.2.1. Any failure shall fail the lot. To meet these requirements, a test report/analysis from the steel manufacturer shall be acceptable in lieu of lot by lot testing when validated by the contractor's own tests on the first lot of steel received. The contractor need not retest again unless a new steel supplier is used.

4.5.1.2 Hardness test. Hardness tests to determine compliance with 3.2.1 shall be in accordance with ASTM E 18. Three readings shall be made within a 4-inch triangle on the blade. Three readings shall be made on the pick, hinge, and the thrust washer. Any reading not within specified requirements shall constitute a defect. Lot by lot hardness testing of these components may be performed as part of in-process examination and need not be repeated as part of end item testing. For all other steel components, a certificate of compliance from the supplier attesting to Rockwell C hardness is acceptable in lieu of lot by lot testing.

4.5.1.3 Bond strength test. To determine the strength of the thrust washer/locking nut bond and compliance with 3.4.3, a locking nut shall be placed in a vice or other suitable fixture and a 500-pound force applied against the inner face of the washer. Any delamination or separation of the washer from the locking nut shall constitute failure of the test.

4.5.2 End item testing. Unless otherwise specified, the sample size for testing shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 4.0.

4.5.2.1 Function test. To meet the requirements of 3.4.5, the locking nut shall be threaded in place tightly enough to prevent undue movement of components but allow unthreading without the use of excessive force. There shall be no more than 1/64 inch of movement in the perpendicular or horizontal direction with the locking nut threaded in place as described above. Noncompliance shall constitute failure of this test.

4.5.2.2 Handle moisture content testing. Moisture content testing to meet the requirements of 3.4.6 shall be part of quality conformance inspection. Moisture testing shall be performed in the following manner: Using a calibrated moisture meter, readings shall be obtained from each end of the handle and its mid point. The handle's moisture content will then be determined by averaging the three readings.

4.5.2.3 Strength test. The combination tool shall be tested as specified in figure 2 to meet the strength requirements of 3.5. Any permanent set, fracture, or break of any component shall constitute failure. Permanent deflection in excess of 1 inch shall constitute failure.

5. PACKAGING

5.1 Preservation. Each combination tool shall have the shovel and the pick in the folded position and the locking nut hand tightened. A corrugated sleeve or other type of cushioned cover shall be placed over the folded blade/pick for protection. All other preservation shall be in accordance with ASTM D 3951.

5.2 Packing. Ten tools, preserved as specified in 5.1, shall be packed for shipment in a box complying with the Uniform Freight Classification and the National Motor Freight Classification. Each box shall be type CF, class Domestic, variety DW, grade 500, style FTC of the latest revision of PPP-B-636. Inside dimensions shall be 46 inches long by 8 inches wide by 11 inches deep. Tolerances on all dimensions are -1/2 inch +1 inch. Metal fasteners shall be used on all corners and joints. Boxes shall have the flaps outside the side panels of the body and inside the end panels of the cover. When set up, the flaps of the cover shall not overlap, but shall have sufficient length to be securely fastened to the adjoining walls with no less than five staples.

5.3 Marking. In addition to any special marking required by the contract or purchase order, shipping containers shall be marked in accordance with FED-STD-123.

6. NOTES

6.1 Intended use. The combination tool is intended for use by wildland firefighters for digging in the soil to construct fireline on wildfires and controlled burn operations, and by other workers to construct or repair trails, and for general forestry work. Shovel blade edges are serrated making it possible to cut light brush.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. When a first article samples are not required (see 3.1, 4.3, and 6.3).

6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of Federal Acquisition Regulation (FAR) 52.209. The first article should be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Lubricant. Molycoat 557 from Dow-Corning and MOLY-XL 931 from Master Lubricants Co. are acceptable products to meet the lubrication requirements of 3.4.4.

6.5 Recycled material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this specification (see 3.2).

6.6 Notice. When Government drawings, documents, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever.

6.7 Preparing activity. USDA Forest Service, Missoula Technology and Development Center, Building 1, Fort Missoula, Missoula, MT 59801-7294.

5100-325A

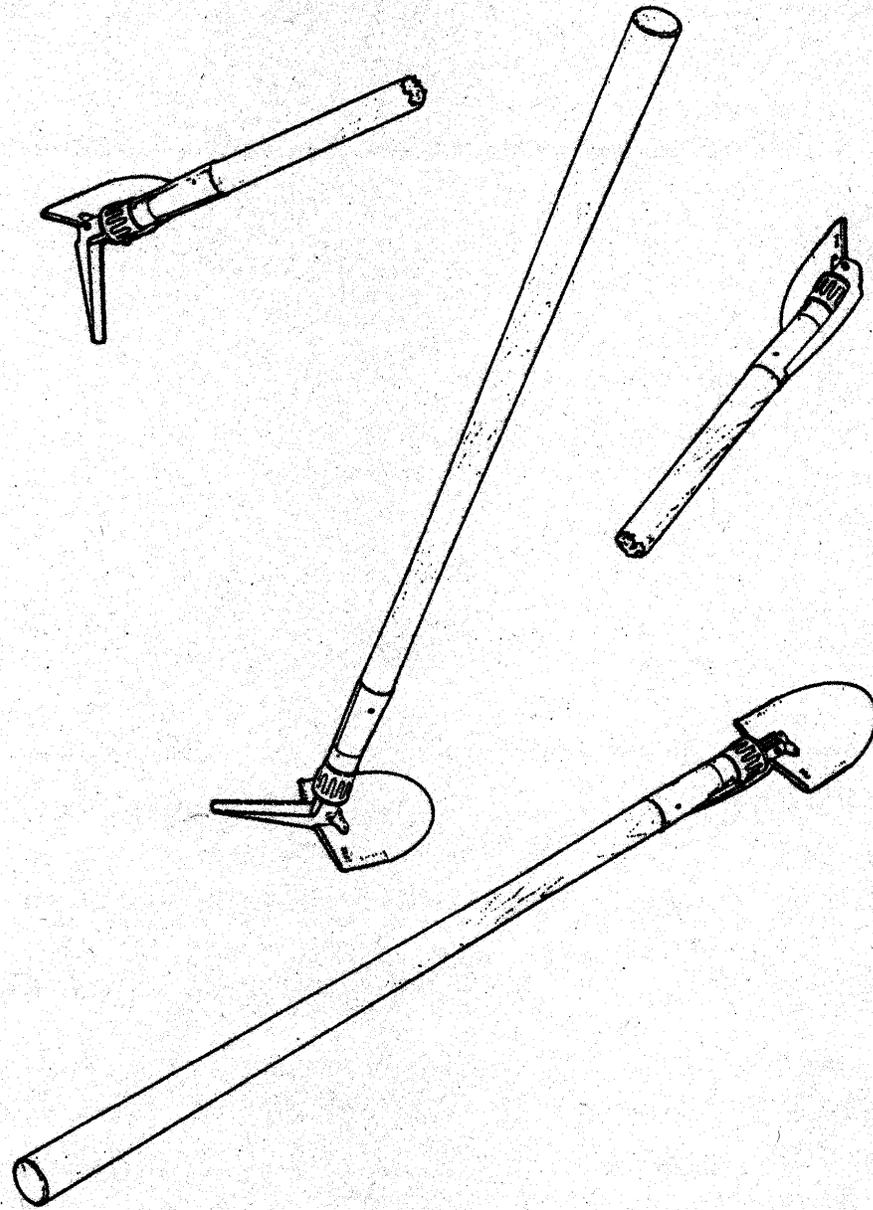
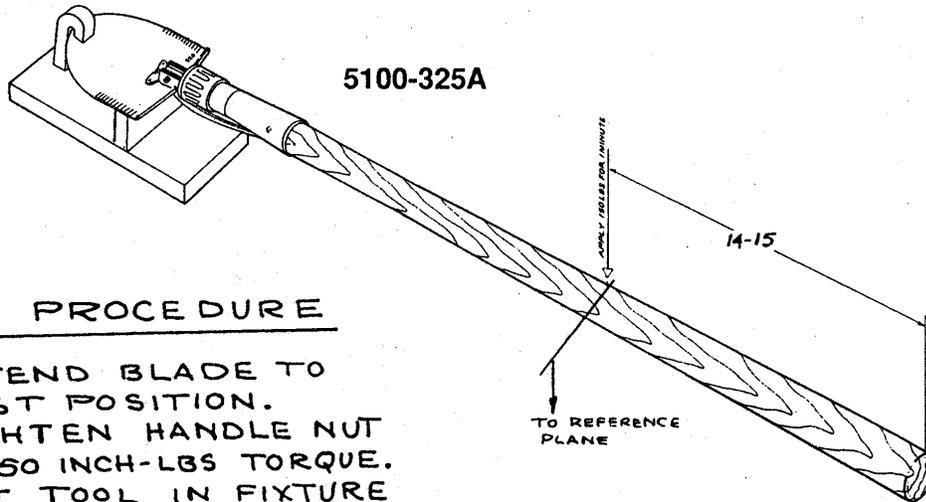


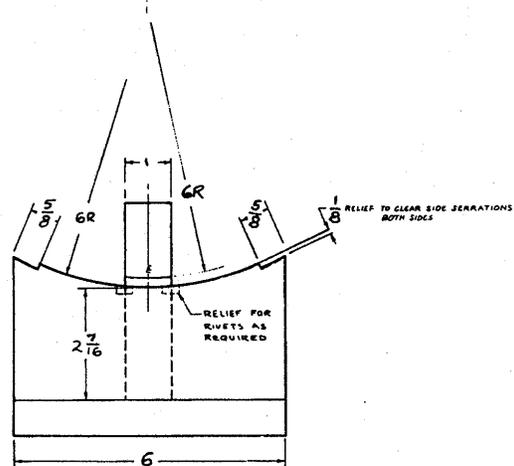
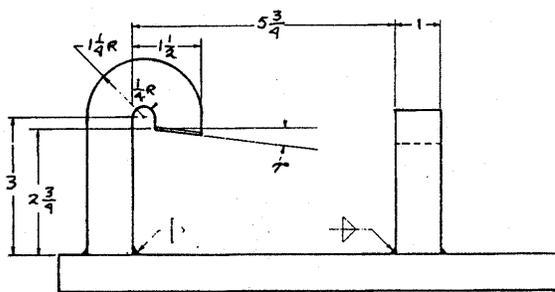
Figure 1.-Fire line combination tool.

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TEST PROCEDURE

1. EXTEND BLADE TO TEST POSITION.
2. TIGHTEN HANDLE NUT TO 50 INCH-LBS TORQUE.
3. SET TOOL IN FIXTURE AS SHOWN.
4. APPLY 5 POUND LOAD AT 14-15 INCH MARK.
5. READ AND RECORD MEASUREMENT FROM THE POINT WEIGHT IS APPLIED, TO THE REFERENCE PLANE.
6. REMOVE 5 POUND LOAD AND APPLY 125 POUND LOAD.
7. REMOVE 125 POUND LOAD.
8. REMOVE TOOL FROM FIXTURE AND LOOSEN NUT AND MOVE BLADE BACK AND FORTH.
9. RESET BLADE TO TEST POSITION.
10. RETORQUE HANDLE NUT TO 50 INCH-LBS AND SET TOOL BACK IN FIXTURE.
11. APPLY 5 POUND LOAD AGAIN.
12. READ AND RECORD MEASUREMENT AT POINT WEIGHT IS APPLIED, TO SAME REFERENCE PLANE USED IN STEP 5.
13. THE DIFFERENCE BETWEEN THE FIRST AND SECOND READING CONSTITUTES PERMANENT DEFLECTION.



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Figure 2.-Combination tool strength test.

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Standardization Document Improvement Proposal

This form is provided to solicit beneficial comments that may improve this document and enhance its use. Contractors, government activities, manufacturers, vendors, and users are invited to submit comments to:

USDA Forest Service
Missoula Technology and Development Center
Building 1, Fort Missoula
Missoula, MT 59804-7294

Attach any additional pertinent information that may be of use in improving this document to this form and mail in an envelope. A response will be provided when the submitter includes their name and address.

NOTE: This form shall not be used to submit requests for waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the document, or to amend contractual requirements.

Document Identification: **5100-325A - Combination Tool**

Submitter's Name (Optional. Please print or type):	Submitter's Organization and Address:
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